Flightfax

ARMY AVIATION RISK-MANAGEMENT INFORMATION

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One minute after takeoff, a Huey crashes. All three crewmembers on board are killed. There are no witnesses. How do we find out...

Answering the questions

Any time an aircraft crashes and there are no survivors and no witnesses, how can we ever know what caused the accident so we can prevent it from happening again? The Centralized Accident Investigation (CAI) approach is to examine all possible scenarios to determine the *most likely* cause of the accident. What follows is an example of such a case.

The accident

The mission was to conduct NVG navigation training at low-level, contour, and nap-of-the-earth (NOE) altitudes. The IP and two students were conducting their second NVG training flight. After a successful first period, they entered hot refuel, and the students changed places. About one minute after takeoff, as they made a left downwind departure from the LZ after refueling, the aircraft struck the ground in a left roll, nose-low attitude while traveling at 60 to 70 KIAS. All three crewmembers were killed.

The investigation

The IP was experienced, but he had only recently completed NVG MOI training and was beginning his third class as an NVG IP. The students were on their second NVG training flight, their first conducting terrain flight. The class was behind due to a period of bad weather, but there did not appear to be any undue urgency on the part of the crew.

The local weather update they got before departing their base field gave the crew the weather they needed to train for the entire flight period. As they took off from the LZ, they encountered the beginning of an unforecast inversion layer. While they didn't indicate any problems with the weather, other aircraft reported ground fog in the area several minutes before and 10 to 15 minutes after the accident occurred.

The crew was on the proper ground track for their departure from the LZ, and there was no evidence that they were attempting to maintain VMC flight in IMC conditions. There was also no indication that they were reacting to any onboard emergency at the time of the accident.

Evaluating the materiel condition of the aircraft was extremely difficult due to the extensive damage. However, intense laboratory examination determined that all major components were functional. There was no indication of any maintenance factor or materiel failure that could have adversely affected flight worthiness.

Consideration of these and other factors led to the conclusion that a combination of unforecast weather conditions and limited crew experience contributed to this accident.

It is probable that, while turning from their crosswind to downwind departure, the crew encountered flight conditions that degraded the performance of their ANVIS goggles. This, combined with their limited NVG experience, likely prevented them from recognizing the flight conditions they were encountering. While not "IMC," the inversion layer probably restricted their ability to identify ground references. It is suspected that they continued flight using degraded visual cues that caused them to falsely interpret their altitude and visible horizon. As a result, the crew became spatially disoriented and flew the aircraft into the ground.

What altered their cues and ability to detect hazards? Several factors can be identified: the beginning of ground fog, refraction of the IR searchlight, and a crew with little or no flight experience in these environmental conditions.

The controls

What can be done to prevent future accidents from the same or similar causes? Training, mission planning, and experience are key controls.

Extreme care must be taken when adverse environmental conditions are encountered during NVG operations. Pilots have to be aware that adverse conditions can reduce the effectiveness of their night-vision devices and create unsafe flight conditions. Good crew coordination between pilots can help less-experienced pilots in the identification of adverse conditions and how to properly react to them. Another control would be installation of a radar altimeter to assist the crew in maintaining a safe altitude in situations where visual acuity is reduced.

CAI: What it is, how it works

Safety investigations are done for accident-prevention purposes ONLY. There is no effort to establish accountability or fix liability—indeed, such efforts are explicitly forbidden by regulation.

Army accidents are investigated under a process that is unique to the Army: Centralized Accident Investigation, or CAI. Through this process, begun in 1978, the Army Safety Center heads the investigations of all Class A and selected Class B accidents (both aviation and ground) Armywide.

This doesn't mean that local installations and supported Army aviation units have no role in accident investigation. The Safety Center team, composed of a field-grade officer and a senior warrant officer, is supplemented at the local level by experts such as a flight surgeon, instructor pilots, maintenance officers, and technical inspectors. When needed, the team can also call in additional experts from outside agencies such as ATCOM, CCAD, and even equipment manufacturers.

The CAI process starts with a phone call. Safety Center investigators are on standby 24 hours a day for immediate deployment anywhere in the world. Arrangements between the Army Safety Center and the local unit are handled by the unit safety officer. He or she arranges for local Board members to supplement the CAI team and also arranges for other support such as personnel to search for missing parts of the wreckage or to crate exhibits for shipment to maintenance facilities or labs for analysis.

CAI provides many advantages, not only in determining what caused an accident but also in developing controls to help prevent future accidents from the same or similar causes. Among the advantages are the following:

■ **Professional investigators.** CAI teams represent many years of accident-investigation experience. Under systems where accidents are investigated at the local level, the chances of board members having any investigation experience are slim.

■ **Continuity and standardization in investigations.** A centralized process used over an extended period of time by full-time investigators establishes continuity and a base of institutional memory on which to draw. In addition, a standardized process of identifying the hazards that led to accidents produces more meaningful controls to prevent future accidents.

■ **Impartiality.** Because CAI investigators are not members of the accident unit, they are not influenced by the command and will not be personally affected by the findings and recommendations. This gives the Board the flexibility to look both objectively and subjectively at records, policies, procedures, and command environment. It also affords the Board freedom from repercussions as a result of identifying deficiencies in the chain of command.

■ **Timeliness and responsiveness.** After 7 to 10 days at the accident site, the Board reviews the evidence and develops tentative findings and recommendations, which they staff via phone with the Safety Center. Before leaving the site, the Board president briefs the local chain of command on the findings and recommendations developed up to that time. The team completes the formal report after returning to the Safety Center. If, at any point during the investigation, a safety-of-flight or safety-of-use issue surfaces, appropriate agencies are immediately notified and steps are taken to alert users Armywide. Subsequent actions may include issuance of a safety-of-flight or safety-of-use message or even DA-level action to ground an entire fleet of aircraft or restrict use of ground equipment Armywide.

When the unexpected happens

Dual engines have brought a safety margin to utility and attack helicopters that wasn't possible with single-engine aircraft. However, as mission demands expand, new equipment is added, and areas of operation and environmental conditions become more extreme, we may no longer have that single-engine capability.

Our missions today span from high-altitude operations in the mountains to low-level overwater flight at sea level, from the bitter cold of the Arctic to the heat of the desert. Have we done everything possible to make operating in these environments as safe as possible?

The mission is to attend a briefing at a field site in a high-altitude mountain environment for an upcoming mission. The temperature is 30°C. The mission helicopter is configured with external stores (i.e., wing tanks full of fuel, Hellfire racks, rocket pods). The aircraft is operating at maximum gross weight for the conditions. Twenty minutes into your flight, you are 50 feet above the ground at 100 knots and 100 meters shy of passing through a saddle in the ridgeline. The master caution light comes on, followed by an engine-out audio and associated caution lights. A quick scan of the instruments confirms the indications: one of your two engines has just failed.

What are you going to do?

Your performance planning indicates that you do not have single-engine capability under the current configuration.

Did you calculate when you would have single-engine capability? If you jettison the external stores, will you regain single-engine capability or just slow your rate of descent to the crash site? Have you allowed yourself enough altitude to react to the emergency? Can you jettison your external stores and start a deceleration to best-rate-of-climb airspeed before you impact the ridgeline?

Did your crew briefing cover in detail all actions required by crewmembers for this situation? Who will do the actual jettisoning of your external stores—and on what command? Was it discussed? Rehearsed?

During your risk analysis for this mission, what actions did you take to reduce the risk? Did your crew briefing include a higher altitude, one that would allow you more time to react to such an emergency? Did you review the height-velocity diagrams in the operators manual?

As part of your risk analysis and management, did you consider using more than one aircraft or make other arrangements for refueling to reduce the weight of the aircraft? Did you consider crew mix? Did the chain of command manage the risk by having it approved and briefed at the right level of command?

Had you been properly trained for this mission? Had the unit received prior mission training for this type of mission? Did your predeployment operations include emergency-procedure training in the SFTS in an environment similar to that you'd be operating in? Did it include operations with external stores attached? Had you been properly trained in emergency procedures with external stores?

Were you ready?

If you couldn't answer yes to all of the above questions, are you properly prepared to handle such a real-life emergency and the follow-on results of such a disastrous scenario?

Members of the accident-investigation board could now be standing on the side of that ridge, viewing the wreckage. They would be changing all the above questions into statements and adding them to the accident report as contributing factors to this accident.

This scenario could easily be modified to be an AH-64 crew moving forward to a battle position. The risk analysis and management, training, and crew-briefing considerations also may be applied to any other dual-engine operations.

Let's look down deep before we head out on a mission and evaluate it from top to bottom, assessing the hazards and the risks. We train real hard for the expected; now let's ask ourselves, "Are we properly trained and totally prepared for the unexpected?" Have we done everything to manage the risks and hazards associated with the mission? Are we doing our jobs or depending on two engines to do our jobs for us?

—CW5 Steve Meline, CW5 Ken Trampe, and CW4 Joe Gonzales, DES, Fort Rucker, AL, DSN 558-2442 (334-255-2442)

Inadvertent IMC: No "magic" altitude

In the "Crew Commo" section of the March *Flightfax*, one writer gave some personal philosophy on what to do if you encounter inadvertent IMC. While most of his recommendations were pretty good advice, the altitude of 1200 feet agl should not be looked at as a "magic" altitude. (See article on page 6 on determining proper altitude for IFR.) The writer correctly said, "Climb," and my discussion here is intended to emphasize the importance of knowing what to do and having the confidence to do it if you find yourself inadvertently on the inside of a cloud.

First, let's look at what our weather-related accidents tell us. During the last 10 years, Army aviators have experienced 24 Class A, B, and C IMC-related accidents, 21 (88%) of which happened at night. This shouldn't come as much of a surprise because you just don't see the weather as well at night as in the daytime—even with night-vision devices. In fact, with NVDs, it's possible to find yourself fully enveloped in visibility-reducing weather unless you occasionally check visibility with your unaided vision. Of the 21 night IMC accidents during the study period, 15 (71%) of the aircraft were using NVDs.

A disturbing but not surprising fact is that all but two of the 24 IMC-related accidents were Class A's. Fifteen of these 22 Class A's resulted in 56 fatalities. Now, I'm not including the last statement to shock you but to make the risk clear: *When an accident occurs as a result of inadvertent IMC, it typically results in fatalities.*

Analysis of the study accidents revealed several consistent factors. As already mentioned, the flight usually occurred at night and with night-vision devices. In addition, most of the aviators were slow to initiate a climb. The accident reports typically included verbiage such as, "The pilot failed to immediately execute inadvertent IMC procedures when he lost visual reference with the ground after flying into restriction to visibility." In many cases, the aviators descended—apparently attempting to regain VMC.

Another issue appeared to be a need to "accomplish the mission." Over and over, pilots pushed weather in an attempt to do so.

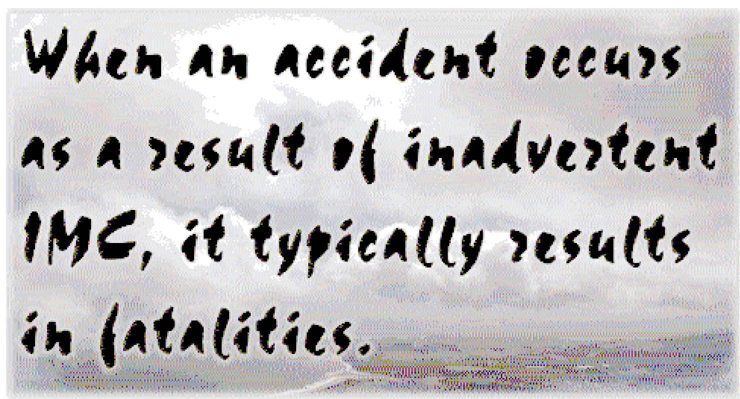
While not specifically addressed in every case, inadequate crew coordination also seemed to be a problem. In several of the cases, both pilots reported that they were attempting to look for VMC and not transitioning to the instruments and committing to IMC.

In many of the cases, ATC tapes indicate the aircrews were anxious and apprehensive. Physiological reactions to fear make concentration on appropriate flight instruments and flight procedures very difficult.

So what can you or your unit do to ensure you don't have one of these accidents?

First of all, no one knows your unit like you, your leadership, or your standardization and safety folks. Those are the people who can identify the most appropriate controls for the hazards I've discussed. Here are some additional ideas that may help:

- Start with the unit SOP. What are the weather minimums for day and night operations? Are they a repeat of what AR 95-1 says? A prudent approach to establishing unit SOP minimums may be to evaluate aviator experience and proficiency levels in your unit. Don't just consider how many senior aviators you have assigned. What is the overall experience level for all assigned aviators? Are your minimums less than 300-½ day and 500-2 at night? If so, on what do you base that decision? Was the SOP written several years ago and not been changed?



- Why would aviators be reluctant to commit to the instruments, climb, and execute an instrument approach? In all likelihood, the aviators just didn't have the confidence that they could contact ATC, get a clearance, and execute the approach while maintaining aircraft control. Units should ensure a good instrument training program is in place that is structured, not just simulator time or hood time to burn flying hours. A key objective should be aviator confidence. Individual aviators should also consider the reason for all the practice: To ***know*** you can execute any approach when you need to.
- All aviators know what it is to "push the weather." What is an alternative? Teach aviators what weather conditions look like when there is 300-½ day or 500-2 at night under NVGs or whatever your SOP calls for. What are acceptable options if the weather starts to deteriorate? Turn around? Land? Unit leadership should be willing to accept that when the weather is below minimums, the mission must be delayed or modified in some way. ➢

■ Crew coordination in the accidents studied was very often missing because in the few cases that could be positively documented, both aviators were trying to see the ground instead of one person on the gauges and the other doing other things.

In the “3 C’s” article that prompted these remarks, the writer’s concern was that aircrews not try to reestablish VMC simply by descending. Rather than using 1200 feet agl as an altitude that “always works,” use the VFR sectional and figure out how high to go. If you depart on a mission in marginal weather, have a detailed plan for each leg of your flight. Make sure all crewmembers are briefed and understand what they are supposed to do. Don’t be reluctant to climb, contact ATC, declare an emergency, and get vectors to final for an approach that will get you safely on the ground. Yes, you may have to write a letter, but that is much better than the potential alternative.

—CW5 Bob Brooks, Aviation Systems Section, USASC, DSN 558-2845 (334-255-2845)

Minimum altitude for IFR operation

The article “The Three C’s Still Work” in the March 1997 issue prompted me to an immediate response. Specifically, it says that, in the event inadvertent IMC is encountered, you are “perfectly legal” and safe to level off and cruise around IMC/IFR at or below 1200 feet agl in an attempt to remain out of controlled airspace.

FAR 91.3 states, “In an inflight emergency requiring immediate action, the pilot in command may deviate from any rule of this part (FAR Part 91) to the extent required to meet that emergency.” I certainly consider unplanned IMC flight as an emergency. It requires an immediate action to include climbing into controlled airspace without a clearance if necessary to safely clear obstacles. You might have to submit a report in writing to the Administrator if asked.

In the event of inadvertent IMC, the appropriate Aircrew Training Manual (ATM) gives specific guidance—with one exception. What is an appropriate altitude? Many of the current ATMs still reference Vertical Helicopter Instrument Recovery Procedures (VHIRP), which no longer exist. This procedure through a letter of agreement with the controlling agency of the overlying controlled airspace of the training area, when activated, would assign an agreed-upon safe altitude if needed. There are no letters of agreement any longer. For this reason it is now the responsibility of flight crews to determine a “minimum altitude for IFR operation.”

FAR 91.177 reads as follows:

> *Except when necessary for takeoff or landing, no person may operate an aircraft under IFR below:*
> *(1) The applicable minimum altitudes prescribed in parts 95 and 97 of this chapter, or*
> *(2) If no applicable minimum altitude is prescribed in those parts—*
> *(a) In the case of operations over an area designated as a mountainous area in Part 95, an altitude of 2,000 feet above the highest obstacle within a horizontal distance of 4 nautical miles from the course to be flown; or*
> *(b) In any other case, an altitude of 1,000 feet above the highest obstacle within a horizontal distance of 4 nautical miles from the course to be flown.*
> *However, if both a MEA and a MOCA are prescribed for a particular route or route segment, a person may operate an aircraft below the MEA down to, but not below, the MOCA, when within 22 nautical miles of the VOR concerned.*

So what’s the minimum altitude for IFR operation? If you are established on a Victor airway, it’s the MEA or MOCA, depending on the distance from the navaid. If you are on a direct leg of flight with prior planning, it’s 1,000 or 2,000 feet, depending on nonmountainous or mountainous, above the highest obstacle within 4 nautical miles either side of centerline. So if this is unplanned IFR, you probably are not established on an airway, and I doubt you drew the course and determined the highest obstacle 4 NM either side of centerline; you probably will be happy to use an altitude that may be a little higher for safety’s sake. If you are within 25 nautical miles of a navaid with a published approach, there will be a minimum safe altitude published in the plan view of that approach chart. If you are greater than 25 NM or you are not sure of the distance, the off route obstruction clearance altitude (OROCA) printed in large, light-brown numbers on the low-altitude en route chart will apply.

—CW5 Ken Trampe, SP/IE, DES, Fort Rucker, AL, DSN 558-3504 (334-255-3504)

What was that lat/long again?

When I deployed to Operation Joint Endeavor, I frequently flew into places accessible only by use of latitude and longitude waypoints. Since our aircraft were new and used the Global Positioning System (GPS) as our primary navigation system, it wasn't a problem—most of the time.

Like most systems, ours stores information internally until someone changes or deletes it. It was common practice to use stored information for current flights. There's nothing wrong with that IF the stored information is correct. However, it's not always.

Life was great flying in and out of Bosnia. No problems. One day, however, as I was approaching a key checkpoint—I thought—the controller asked if I was going to that waypoint. When I said that I was, he replied that he showed it 13 miles northeast of where I was. Since my equipment showed that I was almost there, I decided to check the lat/long information to ensure it was programmed right. It wasn't.

I had depended on someone else's work and lucked out with a high-altitude waypoint that wasn't going to run me into a mountain. You can bet I check my waypoint lat/longs now.

At lower altitudes, a one-digit change could be disastrous, even if it's the last digit in the latitude or longitude. The safety margins in Europe, especially in former Eastern Bloc countries, are not always what they are in the States. Minimal margins may not be met with that last number even one digit off. I didn't really appreciate that fact until I flew my first VMC approach into Sarajevo. After a couple of months of solid IMC approaches and breaking out at or near minimums, it was a real eye-opener seeing all those mountains for the first time!

Systems that update once a month by diskette, as ours do, also need double-checking. Sometimes the original programmed lat/longs are different from what is published on approach plates or en-route charts. I still find those on occasion. New units installed as replacements may not be initialized for your location, either. Be sure to check the initialization page when it's first turned on to verify the correct date, time, and location lat/long. An incorrect date or time may have the unit looking in the wrong part of the sky to find a satellite from which to navigate.

The point is this: Though GPS is a safe and accurate system, it's only as good as its programming—and YOU are the programmer. Verify, verify, and verify again.

—CW4 Keith Lane, ASO, 2d Battalion, 228th Aviation Regiment, Horsham, PA, 215-957-1378

STACOM

STACOM 169 ◆ May 1997

DES has become aware that some UH-60 IPs are initiating stabilator auto mode failures by manually slewing down the stabilator during flight. Doing so above 40 knots will exceed chapter-5 placard airspeed limits and could result in a hazardous flight situation. The next change to TC 1-212 (UH-60 ATM) will include the following procedure change:

"Simulated stabilator auto mode failures will be induced by momentarily placing the stabilator manual slew switch to the UP position or by using the cyclic slew-up switch. Instructor pilots must ensure that the stabilator moves up enough so the placard airspeed limits are not exceeded. At no time will the stabilator be slewed **DOWN** when the aircraft is above **40 KIAS** or to the **FULL UP** position in flight."

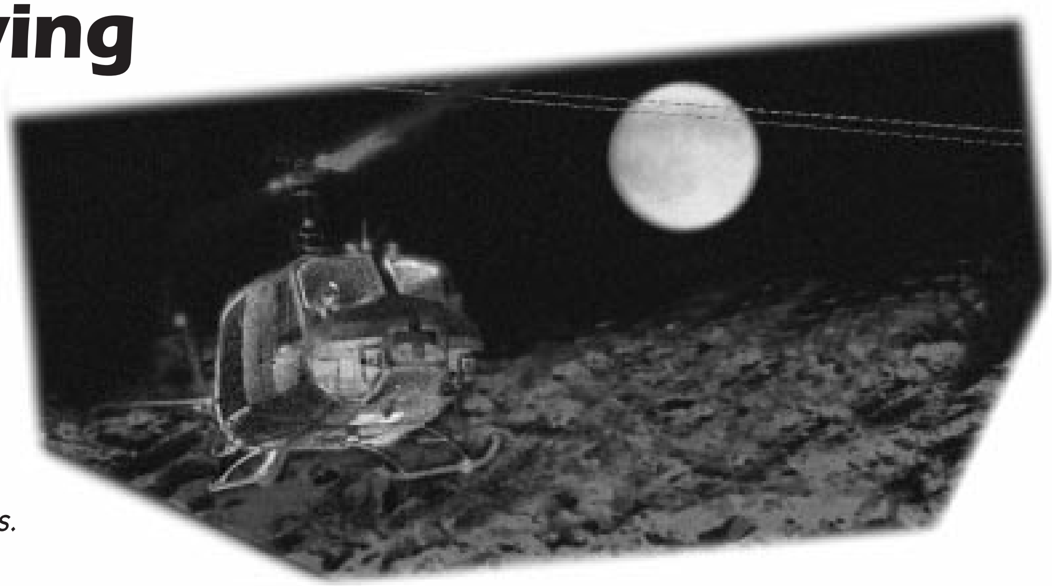
The above pertains to performing the procedure in the aircraft and does not restrict stabilator malfunctions in the UH-60 flight simulator.

—POC: Mr. Craig Cameron, DES, DSN 558-9029 (334-255-9029)

Standardization Communication ■ Prepared by the Division of Evaluation and Standardization, USAAVNC, Fort Rucker, AL 36362-5208, DSN 558-2603/2442. Information published in STACOM may precede formal staffing and distribution of Department of the Army official policy. Information is provided to enhance aviation operations and training support.

Broken wing awards

The Army Aviation Broken Wing Award recognizes aircrewmembers who demonstrate a high degree of professional skill while recovering an aircraft from an inflight failure or malfunction requiring an emergency landing. Requirements for the award are in AR 672-74: Army Accident Prevention Awards.



■ *CW2 James L. Coxwell, Jr.*

82d Medical Company (Air Ambulance)
Fort Riley, KS

The mission was to conduct an NVG orientation flight for a flight medic and NVG navigation training for the copilot, a recent flight-school graduate with less than 30 hours of NVG time. Illumination was at 98 percent, and the moon angle was approximately 30 degrees above the horizon, causing the NVGs to darken when the moon was viewed directly.

CW2 Coxwell, the PC, was on the controls of the UH-1V at 90 feet agl and 45 KIAS when he felt the aircraft yaw left, then right, and noted a change in engine noise. A check of his instruments showed rotor rpm in the normal range and N2 at zero. Then the rpm warning light came on, the rpm audio sounded, and the engine chip detector and master caution lights also came on.

Realizing he had an engine failure at low level over hilly terrain, CW2 Coxwell reacted immediately, turning the aircraft to a heading of 330 degrees to clear a mountain upslope. He initiated an autorotation to the only available landing site—an open area with an 8-degree upslope, wires nearby, and a pond to the immediate rear. He had the copilot verify all instrument readings as he landed the aircraft with zero ground run on the uneven, rocky, uphill slope. The aircraft was not damaged, and no one was injured.

■ *Mr. Cortney J. Stratman*

160th Special Operations Aviation Regiment (Airborne), Fort Campbell, KY

The mission was low-level NVG navigation training with a rated student pilot in an MH-6C, a modified OH-6. Mr. Stratman, the IP, was on the controls when, at 400 feet agl and 100 knots, he felt a slight left yaw and noticed the N1 and N2 fluctuating. Being over rolling, tree-covered hills with few open areas, he made an immediate 180-degree turn back to an open field he had just passed. The flat, plowed, snow-covered field was surrounded by 80- to 100-foot trees. When N1 spooled down to 60 percent, he entered autorotation and retarded the throttle to idle. At 50 feet agl, Mr. Stratman began the deceleration. At this time the engine-out light came on, along with the engine-out audio. Just before application of initial pitch at 10 to 15 feet agl, Mr. Stratman saw a 5-foot-high fence directly to his front. He manipulated the controls to extend his glide in order to miss the fence and landed the aircraft without damage.

■ *CW2 Robert G. Wilkey*

1st Battalion, 14th Aviation Regiment
Fort Rucker, AL

CW2 Wilkey's mission was to conduct artillery gunnery training of a rated student pilot. The OH-58D(I) was loaded heavy with fuel and Hellfire and air-to-air stinger missiles. While hovering out of ground effect over a firing pad surrounded by trees, the aircraft exprienced complete hydraulics system failure and started descending and drifting backward in a nose-high attitude.

CW2 Wilkey immediately identified the problem and realized he would not be able to descend from his 60-foot hover to the pad below without damage and possible injuries. He was able to level the aircraft, began a climb, and maneuvered away from the impact area as soon as he was clear of obstructions. He then increased airspeed to a point where the aircraft became more controllable. He continued to execute emergency procedures, finally making a running landing without damage or injury at the nearest suitable airport.

Shortfax
Keeping you up to date

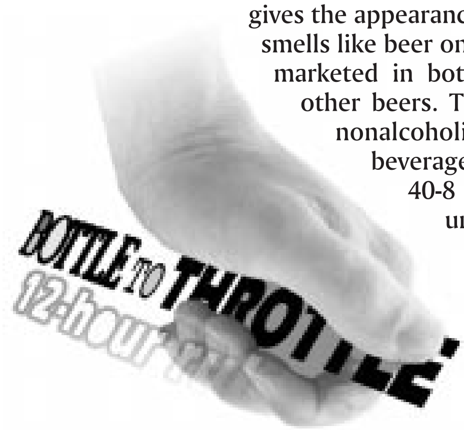
Nonalcoholic beer and flying

Every member of the Army aviation community is familiar with the old "12 hours bottle-to-throttle" maxim. Specifically, AR 40-8 restricts flying duties for 12 hours from the last drink and until no residual effects remain. Safety is the ultimate concern.

Over the last few years as drinking and driving has become socially, militarily, and legally unacceptable, nonalcoholic beers have hit the market. What are they? They are, in fact, beer—brewed, fermented, malt beverages. However, "nonalcoholic" is a misnomer; the brew is ***low*** alcohol, not ***no*** alcohol.

The average nonalcoholic brew contains 0.5 percent ethyl alcohol, compared to 5 to 7 percent (and occasionally more) in traditional beer. Because it is required by law to be labeled, nonalcoholic beer is classified as an alcoholic beverage.

This brings up the question of Army aviation policy regarding nonalcoholic beer. The Aeromedical Consultants Advisory Panel of the Army Aeromedical Center at Fort Rucker reviewed information on nonalcoholic beer, including "perception" issues. Under AR 600-85, Army Drug and Alcohol Prevention and Control (ADAPC) does not differentiate nonalcoholic from alcoholic beer; rather, beer is beer. As noted earlier, nonalcoholic beer does have some alcohol content, albeit a very small amount. And then there is the "perception" issue to consider. A person drinking nonalcoholic beer gives the appearance of drinking beer, nonalcoholic beer smells like beer on the breath and on clothing, and it is marketed in bottles and cans that are identical to other beers. Therefore, the aeromedical policy on nonalcoholic beer is that it is an alcoholic beverage. The medical recommendation in AR 40-8 of 12 hours from the last drink and until no residual effects remain will not be altered for nonalcoholic beer.



"Twelve hours bottle-to-throttle" remains the rule.

—LTC Wallace Seay, Chief, Aeromedical Education Branch, U.S. Army School of Aviation Medicine, Fort Rucker, AL, DSN 558-7461 (334-255-7461)

Testing of grounding points

FM 10-68 requires that all hangar and flight-line grounding points be inspected and ohms-tested annually or whenever there is a possibility of mechanical damage. However, this requirement will change in the near future when FM 10-68 is superseded by FM 10-67-1. The new manual will change the ohms-testing requirement from once a year to once every 5 years. All other inspection criteria will remain the same.

The new FM is scheduled for fielding by the end of the year. Until then, users have two options: adhere to FM 10-68's annual requirement or file a Memorandum for Record stating that the soon-to-be-released FM 10-67-1 requires testing of grounding points every 5 years.

—MSG Eddie Davis, USASC, DSN 558-3650 (334-255-3650)

UH-60 survey

The U.S. Army Aviation RDEC Aerodynamics Directorate (AAFD), with support from the U.S. Army Aeromedical Research Laboratory, is conducting research to identify engineering changes that could reduce the risk of pilots reacting improperly to single-engine emergencies in dual-engine aircraft. AAFD has developed a survey questionnaire designed to evaluate cockpit pilot vehicle interface issues associated with single-engine emergency procedures (SEEP) based on human-factors criteria. The survey is being sent to all Active Army and National Guard UH-60 units.

POC: Dr. C.A. Simpson, Army Aeroflightdynamics Directorate (AMSAT-R-AB), 415-604-5096, seep@merlin.arc.nasa.gov

ACM: The continuing saga...

You may recall my article in the August 1996 Flightfax that talked about some of the rescue, recovery, and investigation concerns about advanced composite materials (ACM). Well, I received many calls with comments, requests for additional information, and constructive criticism, so I felt compelled to share some of this with you.

I received many requests for SOPs. I have to tell you that there's no existing SOP that you can adopt outright; however, the article contains all the pertinent procedures and policies that you can format to suit your unit and mission. Feel free to plagiarize my article for this purpose.

One correction concerns the handling and disposal of debris. Do not automatically assume that burned composite debris is nonhazardous. Before you allow unprotected personnel to handle or dispose of burned composite materials, consult the local environmental office.

A second issue that begs clarification concerns the application of a fixant to burned debris and the wearing of respiratory protection. Contrary to the original article, ***a respirator is warranted, even after a fixant has been applied, until vapor or mist generation is no longer a concern.***

Thanks for the calls and recommendations.

—MAJ Paul Nagy, USASC Operations Officer, DSN 558-2539 (334-255-2539)

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1

Class E

F series

■ Master caution, alternator, and rectifier lights came on and SCAS channels disengaged during OGE hover check. Aircraft was hovered a short distance to parking after unsuccessful attempts to reset alternator switch.

■ During preflight, hydraulic fluid was found leaking from No. 3 reservoir. Maintenance found a stone-like pellet lodged in the valve between the No. 2 and No. 3 hydraulic systems.

AH64

Class C

A series

■ At 30 feet agl and 15 KIAS during terrain-flight takeoff over a 15-foot berm, No. 1 engine quit due to catastrophic failure of GG rotor section. Without sufficient altitude remaining to fly through minimum single-engine airspeed, aircraft landed 123 feet forward of the berm. The aircraft sustained no airframe damage, but crew could not determine maximum torque applied to and temperature of No. 2 engine during descent. As a result, overtemp/ overtorque of No. 2 engine and overtorque of drive components are suspected.

■ **Aircraft-ground accident.** During runup, power levers were advanced to FLY. At about 89-percent Np/Nr, maintenance test pilot felt a shudder and retarded power levers to idle. All indications were normal, and a normal shutdown was completed. Postflight inspection revealed significant foreign-object damage to No. 4 tail-rotor drive shaft next to utility hydraulic manifold and surrounding components.

Class E

A series

■ On final approach at night, collective in both crew stations suddenly became very loose. IP landed aircraft without incident. Cause not reported.

■ During refueling with No. 2 engine off, aft fuel tank started to overpressurize. Refueler had completed fueling aft tank and was starting to fuel forward tank when aft tank began to vent overboard from the overflow vent. Refueler signaled aircrew, who shut down aircraft with no further incident. Inspection revealed failure of NIU check valve and aft tank pressure-relief valve.

■ During OGE hover at 300 feet agl, pilot saw an 8- to 12-percent torque differential between No. 1 and No. 2 engines. He immediately accelerated through single-engine airspeed and landed without incident. Maintenance replaced electrical control unit, performed operational checks, and released aircraft for flight.

■ During departure from range at night, No. 1 nose gearbox oil hot and chip lights came on at 100 feet agl and 40 knots IAS. After identifying and having CPG verify power lever No. 1, pilot pulled it to idle. Maintaining approximately 100-percent torque single-engine, he climbed to 3700 feet msl and flew without incident to destination. Cause not reported.

■ During preflight, pilot found that cooling fan in aft avionics bay would not spin freely. Maintenance replaced fan and submitted QDR.

■ During taxi after landing, crew smelled hydraulic oil. Utility hydraulic psi light came on and psi gauge read zero, followed by utility low light. Postflight inspection found utility hydraulic line in catwalk area had blown out middle. Line was replaced.

CH47

Class B

D series

■ **Aircraft-ground accident.** About 5 hours after being parked on the frozen ground of an LZ, one CH-47D slid 150 feet down slight incline and banged into another. The aft pylon of the sliding aircraft was damaged, as was the No. 2 engine and mounts of the stationary aircraft.

Class C

D series

■ Two blades of forward rotor system struck drogue during aerial refueling with MC-130. Aircraft landed at nearby airport without further incident. Inspection revealed damage to both red and yellow forward blades.

■ **Flight-related.** At 50 feet agl on short final, load consisting of 30kW generator and water purifier fell to the ground. Cause unknown.

■ During run-on landing to unimproved, snow-covered strip at night, aft rotor system contacted tree. All aft main rotor blades were damaged.

■ No. 2 engine failed at 1000 feet agl at 120 KIAS. Aircraft continued to descend despite attempts to maintain flight, and rotor rpm continued to decrease. During landing to plowed field, aircraft bounced, landing nose-gear first. Chin bubbles and antennas were damaged.

Class E

D series

■ Oil was seen leaking from aft transmission area during refueling. Packing in aft transmission auxiliary oil pressure switch was replaced.

OH6

Class C

J series

■ During landing on high-gross-weight training mission, aircraft sustained engine overtorque by 2.8 psi (over 84-psi max).

■ On go-around for landing during high-gross-weight training, aircraft sustained engine overtorque by 5.6 psi (over 84-psi max).

OH58

Class B

D series

■ During power recovery after simulated engine failure at altitude, aircraft regained insufficient (50%) engine power. Aircraft settled to ground, rocked forward (damaging chin bubbles), then rearward, at which time main rotor blades severed tail boom.

Class C

D series

■ During approach to assembly area after departing FARP at night under

NVGs, crew realized they were descending on a tent. During left turn to avoid the tent, aircraft began settling with power. As power was applied to arrest descent, aircraft experienced MAST overtorque to 102 percent and engine overtorque to 132 percent.

■ Crew was conducting simulated engine failure. Upon termination with power, aircraft touched down and became airborne again, rotating 240 degrees to the right before coming to rest upright. Landing gear was damaged, as was airframe in vicinity of left aft landing gear mount.

A series

■ During confined-area takeoff from field site with three personnel on board, aircraft was unable to sustain flight at 40 KIAS. Aircraft descended into rice paddy, rocked 180°, and came to rest upright. Main rotor blades struck tail boom and windscreen, damaging all three components.

Class E

D series

■ Total electrical failure occurred when IP switched on No. 1 battery switch (No. 2 was off) for charging. Engine supervisory control defaulted to the high side, and manual operation was required to maintain Nr and Np in normal ranges. Crew initiated proper emergency procedure and landed at airfield without incident.

UH1

Class E

H series

■ Engine chip-detector light came on during climb to cruise altitude. PC landed aircraft in field. Cause not reported.

■ Crew heard muffled pop during straight and level flight at 110 knots and 44 psi torque. Ten to fifteen seconds later, crew noted engine oil pressure gauge decreasing through 45 psi, followed shortly by master caution and engine oil pressure segment lights. Engine torque gauge dropped to zero during the 4-mile flight to landing site, where aircraft landed without incident. Cause of problem not reported.

■ Master caution and DC generator segment lights came on during cruise flight. Maintenance replaced voltage regulator.

V series

■ During crosswind turn after takeoff, pilot noticed antitorque pedals required unnatural force to keep aircraft in trim. He returned to airfield and landed without incident. Maintenance found a racheting bearing on a bellcrank for the antitorque pedals.

■ Cyclic control began to pull to the right forward quadrant with increasing force during cruise flight. Aircraft was landed at next intended way-point. Cause not reported.

■ Master caution and engine chip lights came on during level-off check, and aircraft returned to airfield. Maintenance pulled engine chip plug and found it covered with flakes and slivers. Category I QDR was submitted.

UH60

Class C

A series

■ Main rotor blades contacted side of 45-degree slope during troop insertion at night under NVGs. Two blades sustained damage requiring depot-level repair and all four tip caps required replacement.

■ Crew was conducting training flight with secondary mission to determine whether master caution light would illuminate while panel lights were in dim mode. Crew had performed decelerations in attempts to illuminate the master caution light. During terrain flight deceleration at 125 feet agl and 95 KIAS with aircraft in 15-degree nose-up attitude, nose cowling opened. Crew landed in field, assessed damage, and secured cowling. Aircraft returned to home station without further incident.

L series

■ Suspect that main-rotor blades contacted tree during confined-area operations at night under NVGs. All four tip caps were damaged.

Class E

A series

■ Aircraft turned right when PC applied left pedal during maintenance test flight. More left pedal was applied, but aircraft did not respond appropriately. Inspection revealed that the pressure and return lines on the tail-rotor servo had been reversed.

■ Slight oscillation was observed periodically on No. 1 engine during maintenance test flight. After a few minutes, full oscillation was observed. Crew executed emergency procedures, and the aircraft landed safely. Maintenance determined that ECU failed. It was replaced and the aircraft released for flight.

■ Postflight inspection revealed damage to tail rotor drive shaft cover, which had been left unsecured.

■ **Flight-related.** During ground taxi, a tiedown chain that had not been removed from the cargo hook became caught in the hook. It pulled a tiedown anchoring point from the ground as it brought the aircraft ground taxi to a halt. The crew chief removed the chain from the hook, inspected the aircraft, and noted no damage.

■ Stabilator failed the self-test during runup. Runup sequence was aborted. Maintenance replaced air data transducer.

■ Crew noticed aircraft leaning to left during runup. Crew chief inspected right drag beam and found that it was cracked. The drag beam was replaced, and aircraft was released for flight. QDR was submitted.

C12

Class E

C series

■ Pilot felt bumpy feedback and sluggishness in rudder pedals during taxi from ramp to taxiway. A look in nacelle-mounted mirror revealed flat nose-gear tire. Nose wheel was replaced.

D series

■ When gear handle was selected down during approach, nose-gear indicator showed unsafe. PC performed emergency gear extension and aircraft was landed without further incident.

■ When gear handle was selected to up position during climb after departure, gear remained down with transit light in gear handle illuminated. PC cycled the gear handle down, then up, and gear retracted. PC then placed gear handle down, and gear went down with a safe, down and locked indication. Aircraft was landed with no incident.

R series

■ No. 1 torque gauge dropped to zero during downwind for landing. All other instruments were normal. After uneventful landing, maintenance reseated connector to torque gauge, correcting the problem.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785).

Aviation messages

Recap of selected aviation safety messages

Aviation safety-action messages

AH-1-97-ASAM-02, 211335Z Mar 97, maintenance mandatory.
An inflight fire on a UH-1 has been determined to have originated from a cracked high-pressure fuel fitting. Both UH-1 and AH-1 helicopters use this fitting on the T53 engine. The purpose of this message is to require one-time replacement of the aluminum high-pressure fitting with a stainless-steel fitting. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

C-12-97-ASAM-02, 021555Z Apr 97, operational.
A software problem exists in the AN/ASN-149(V1) global positioning system receiver that manifests itself as a control display unit lockup whenever the receiver is tracking satellite PRN 30, which, for most of the world, is visible twice daily for about 4 hours each time. The purpose of this message is to inform users of the problem and to outline partial work-around procedures to resolve the problem. ATCOM contact: Mr. Mike Heard, DSN 693-1591 (314-263-1591).

CH-47-97-ASAM-04, 131514Z Mar 97, maintenance mandatory.
Hydraulic check valve, P/N 4C3074, manufactured by Crissair, Inc. may have a rivet missing from its poppet. The purpose of this message is to require replacement of the old three-piece configuration of the 4C3074 Crissair check valve with the current improved one-piece design. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

CH-47-97-ASAM-05, 131508Z Mar 97, maintenance mandatory.
There have been three reported instances of AN320-12 castellated nuts found cracked. The purpose of this message is to require inspection of forward and aft rotor system and controls installations and replacement of AN320-12 castellated nuts that have a capital-G vendor identification impression stamp. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

CH-47-97-ASAM-06, 021555Z Apr 97, operational.
See C-12-97-ASAM-02 above.

OH-58-97-ASAM-01, 281600Z Mar 97, maintenance mandatory.
In 1996, a power-off-maneuver restriction was imposed based on incidents involving actual engine failure during the power-recovery transition of a simulated forced landing. The purpose of this message is to remove that restriction from all aircraft after installation of the latest configuration fuel control that has the internal orifice removed. ATCOM contact: Mr. Robert Brock, DSN 693-1599 (314-263-1599).

UH-1-97-ASAM-02, 131315Z Mar 97, maintenance mandatory.
Past practices that configured UH-1H/V aircraft for NVG compatibility included various methods of reducing glare from external navigation and position lights. The purpose of this message is to require a one-time inspection of the position lights and removal of any materials that obscure normal operation of the lights. ATCOM contact: Mr. Bob Brock, DSN 693-1599 (314-263-1599).

UH-1-97-ASAM-03, 211335Z Mar 97, maintenance mandatory.
See AH-1-97-ASAM-02 above.

UH-60-97-ASAM-12, 101220Z Apr 97, informational.
Safety-of-flight message UH-60-96-02 (252130Z Nov 95) removed from service the tail inboard retention plate (P/N 70358-06612-042) made by Fenn Manufacturing Company (cage code 82001). The purpose of this message is to rescind SOF message UH-60-96-02. Results of engineering testing indicate that this part has successfully completed fatigue testing and is now acceptable for use to the published service life of 12,000 hours. ATCOM contact: Mr. Dave Scott, DSN 693-2045 (314-263-2045).

IN THIS ISSUE

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Class A Accidents

through March

		Class A Flight Accidents		Army Military Fatalities	
		96	97	96	97
1ST QTR	October	1	0	0	0
	November	0	0	0	0
	December	0	1	0	0
2D QTR	January	1	2	0	2*
	February	0	0	0	0
	March	2	2	7	1
3D QTR	April	1		3	
	May	0		0	
	June	1		6	
4TH QTR	July	0		0	
	August	0		0	
	September	1		0	
	TOTAL	7	5	16	3

*Excludes 1 USAF pilot trainee fatality

U.S. ARMY SAFETY CENTER

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Thomas J. Konitzer
Brigadier General, USA
Commanding General